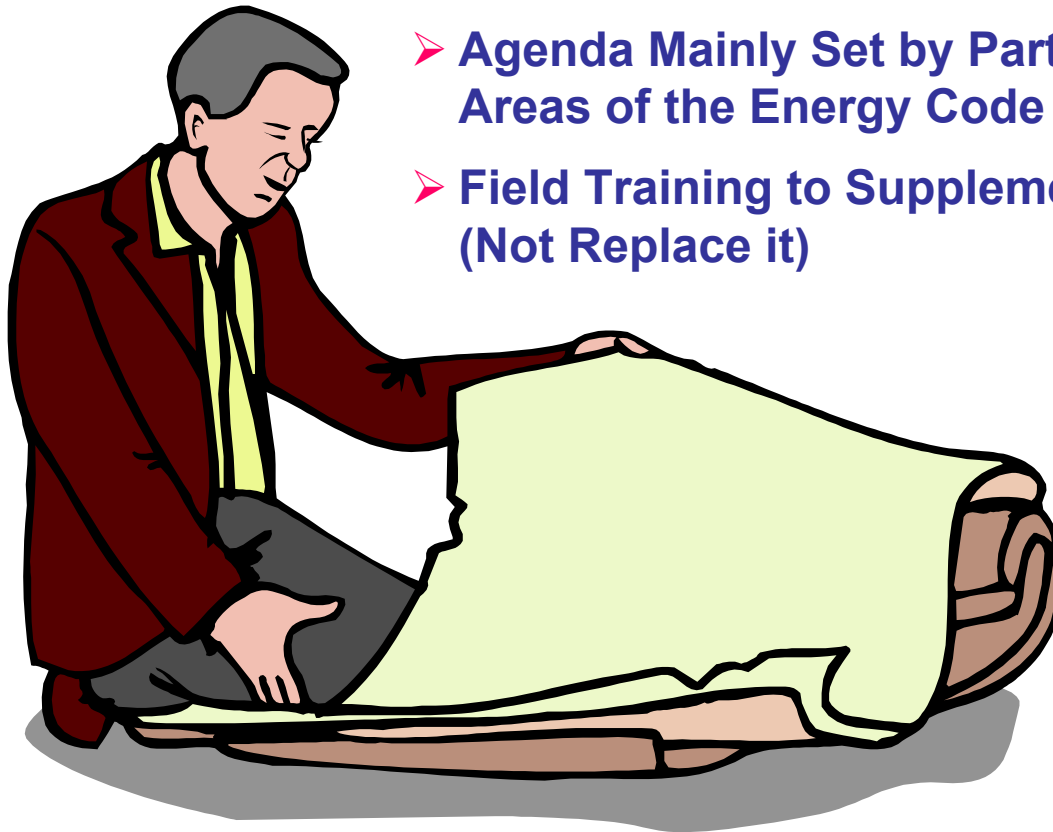


Energy Code Technical Assistance Circuit Rider Program Concept

- Meet with Architects, Engineers, Contractors and/or Code Officials in their Offices to Discuss how the Energy Code Applies to Their Projects
- Agenda Mainly Set by Participants to Focus on Areas of the Energy Code Confusing to Them
- Field Training to Supplement Classroom Training (Not Replace it)
- Review Actual Plans and Specifications to Discuss Concepts Such as “Continuity of Insulation”, “Thermal Bridging” and “Condensation”



Energy Code Technical Assistance Circuit Rider

Program Goals

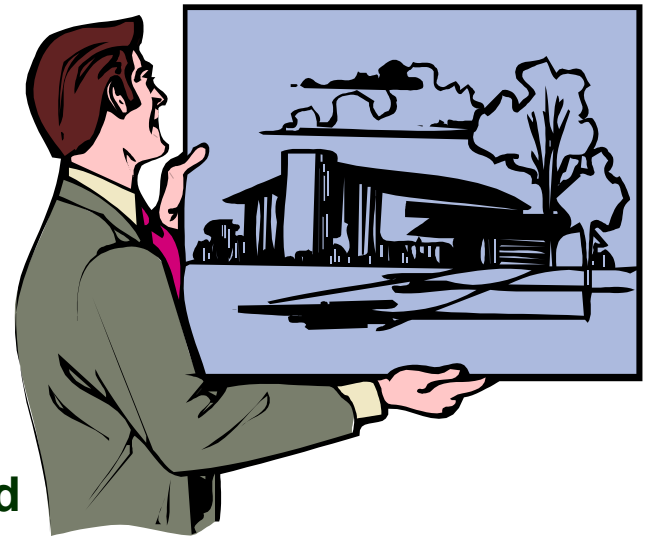
- **Aggressive Support of Energy Code Compliance**
- **Participants Will:**
 - **Gain a Better Understanding of Energy Code Requirements**
 - **Learn Technical Approaches for Complying with the Energy Code**
 - **Discuss State-of-the-Art Approaches for Energy-Efficient Design & Construction Practice**
 - **Learn How and Why to Go Beyond Code**
- **Encourage Positive Attitudes Toward Compliance**
- **Forum for Candid Conversation on Code Issues**

Energy Code Technical Assistance Circuit Rider

Program Intent

➤ The Intent of the Circuit Rider Program was to:

- Openly discuss the advantages and disadvantages of specific building designs, systems, equipment, applications and details that are used to meet the Energy Code.
- Learn from your peers about specific innovative approaches used in the construction industry today to meet and exceed the requirements of the Energy Code.



Energy Code Technical Assistance Circuit Rider

Program Intent (Continued)

➤ The Intent of the Circuit Rider Program was also to:

- To identify and discuss specific requirements within the Energy Code that are difficult to comply with in certain building types or under certain conditions.
- To provide feedback to the Code Agencies concerning areas of the Energy Code that are most often misunderstood or misapplied. This could lead to enhancements to future training curriculums or to possible future changes in code requirements.



Energy Code Technical Assistance Circuit Rider

Program Intent (Continued)

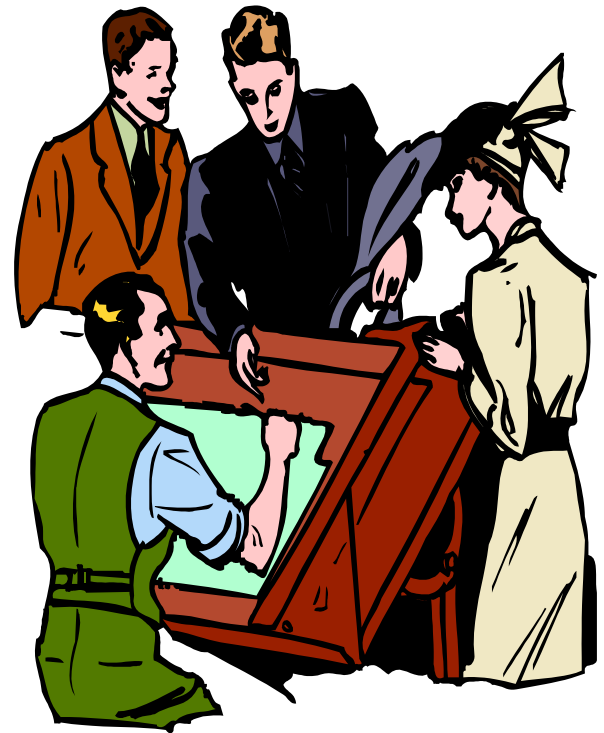
➤ The Intent of the Circuit Rider Program was NOT to:

- Provide legal or binding interpretations on Energy Code compliance for specific details, designs, systems or equipment.
- Promote or provide detailed information concerning specific manufacturer's products or equipment.



Energy Code Technical Assistance Circuit Rider Pilot Program Overview

- Customized to the Needs of the A/E or Contractor Firm
- Available to Any Firm that Participated in Formal Classroom Code Training
- Conducted at Client Offices
- Based on the Requirements in the Massachusetts Commercial Energy Code (Chapter 13)

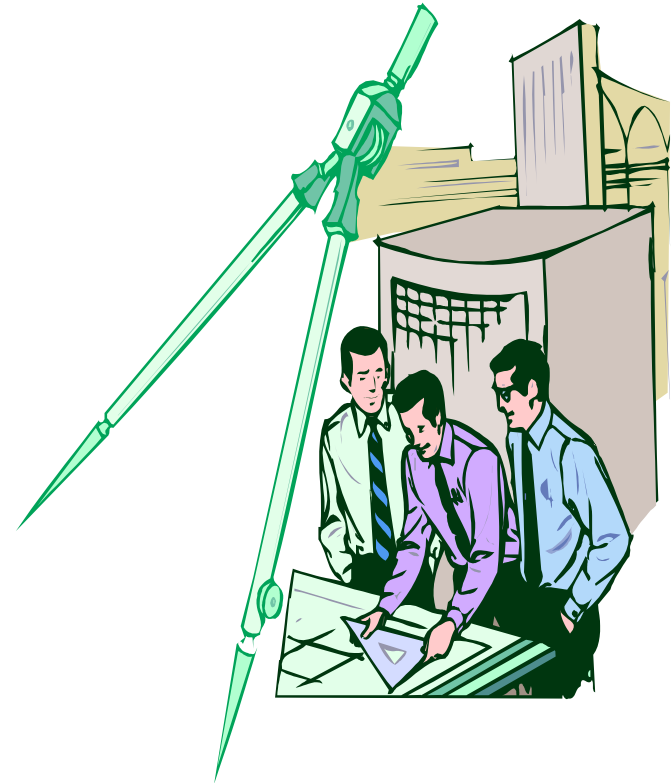


Energy Code Technical Assistance Circuit Rider

Pilot Program Overview (Continued)

➤ Technical Support Features

- Energy Code Clarification
- Technical Assistance with Specific Projects
- Guidance on Technical Topics and Design Approaches for Compliance
- Technical Assistance Team Comprised of Architects, Mechanical Engineers and Electrical Engineers



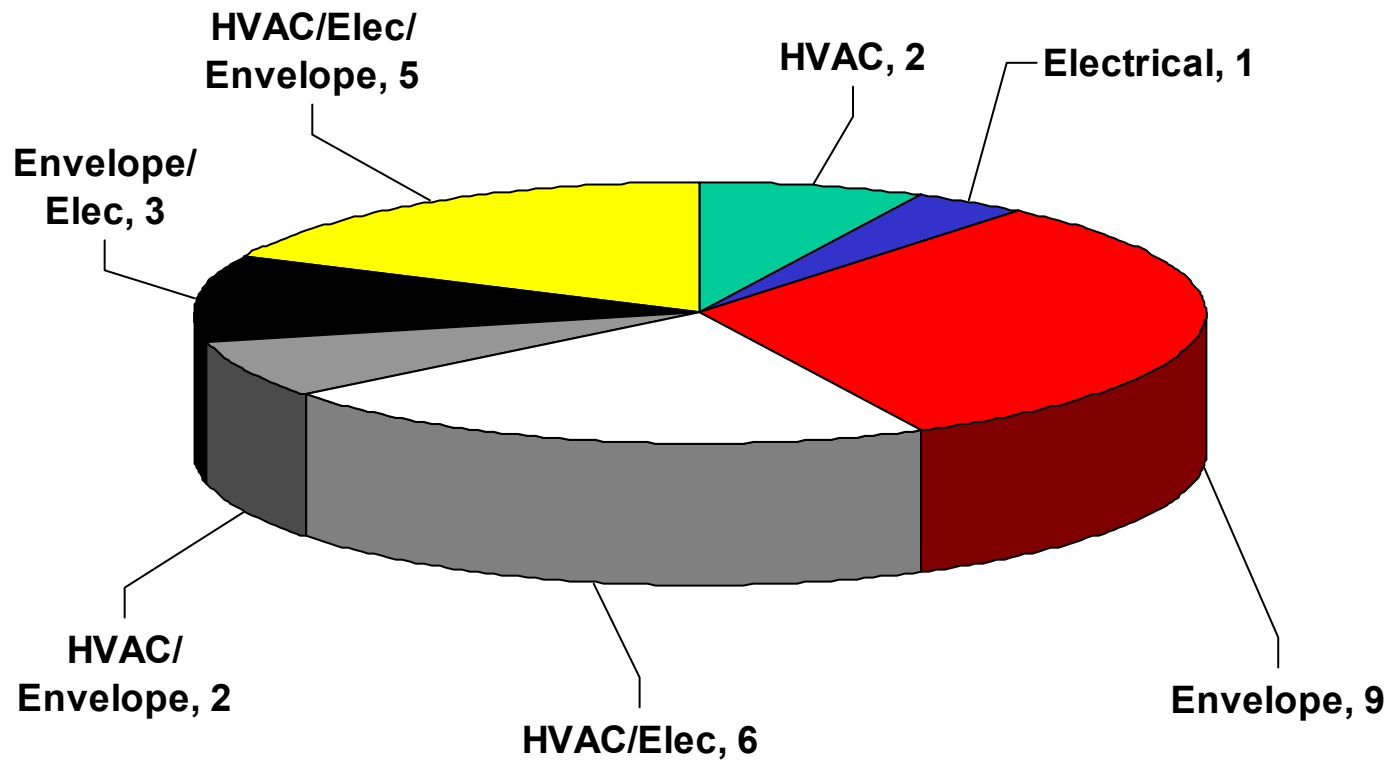
Energy Code Technical Assistance Circuit Rider

Pilot Program Overview (Continued)

- **Six Month Effort (May – November 2001)**
- **Massachusetts (& Vermont)**
- **Attendance at Training Class Required for Participants**
- **Typical Session Attendance: 12-15 people**
- **Session Length: 2-4 hours**
- **Sessions Conducted for Architects, Engineers, Contractors, Vendors, Building Owners**
- **Total Number of Sessions: 28**
- **Sessions Addressed Technical Issues for All Aspects of the Commercial Energy Code**

Energy Code Technical Assistance Circuit Rider

Overview of Session Topics



Energy Code Technical Assistance Circuit Rider

Administrative Tasks

➤ Program Promotion

- Brochure
- Web Page
- Classroom Trainings
- Professional Association Meetings
- Direct E-mailings

➤ Establish Toll-free Telephone Line

➤ Coordinate and Schedule Visits

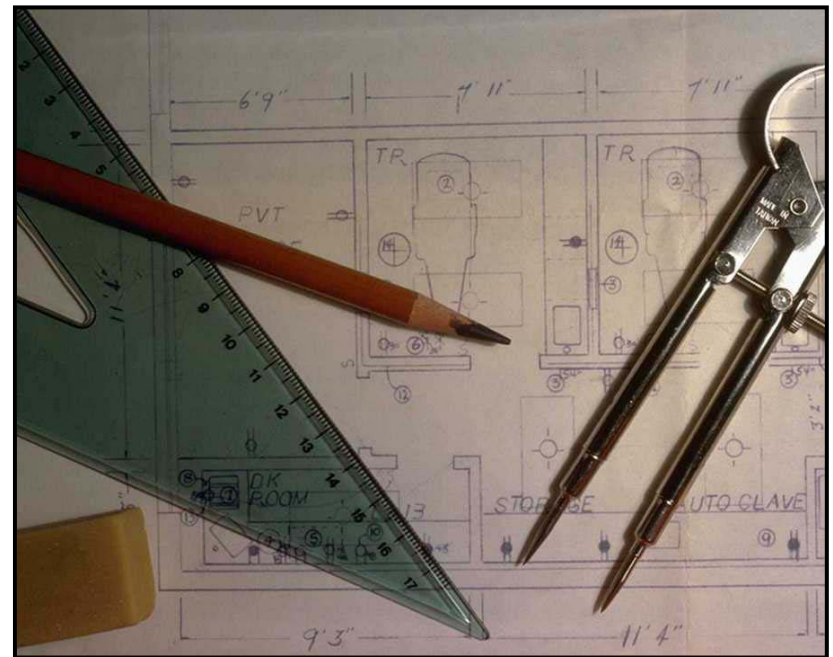
➤ Maintain Database of Callers & Sessions



Energy Code Technical Assistance Circuit Rider

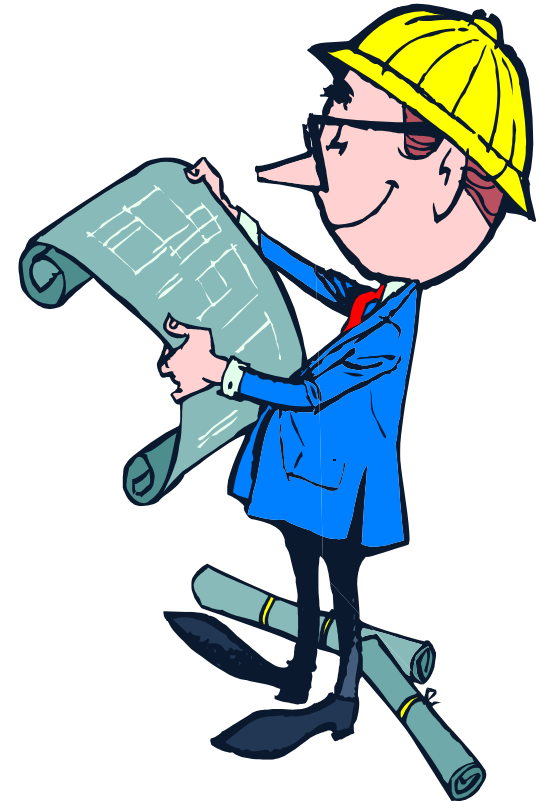
Specific Issues

- Participant Perspectives
- Compliance & Enforcement Issues
- Building Envelope Requirement Issues
- HVAC Requirement Issues
- Lighting Requirement Issues

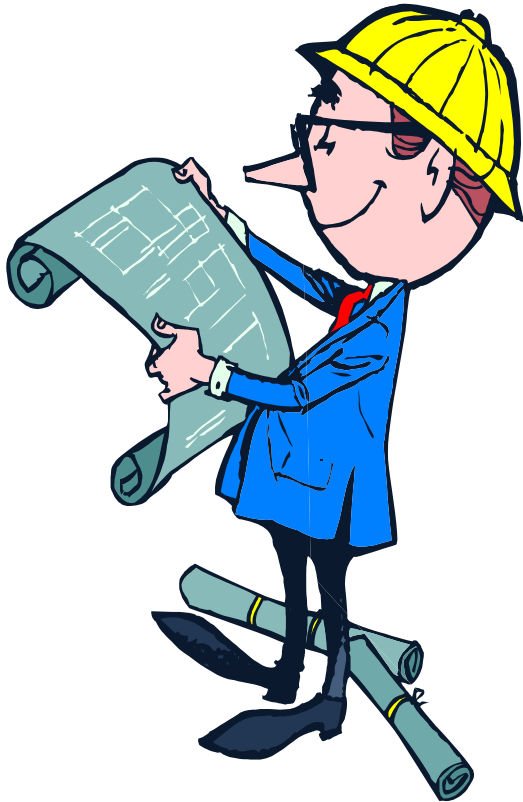


Architect's Perspective

“We always comply with codes. But these new codes are too stringent and I don’t see how we can comply with all elements. These new requirements will make buildings much more expensive.”



Architect's Perspective



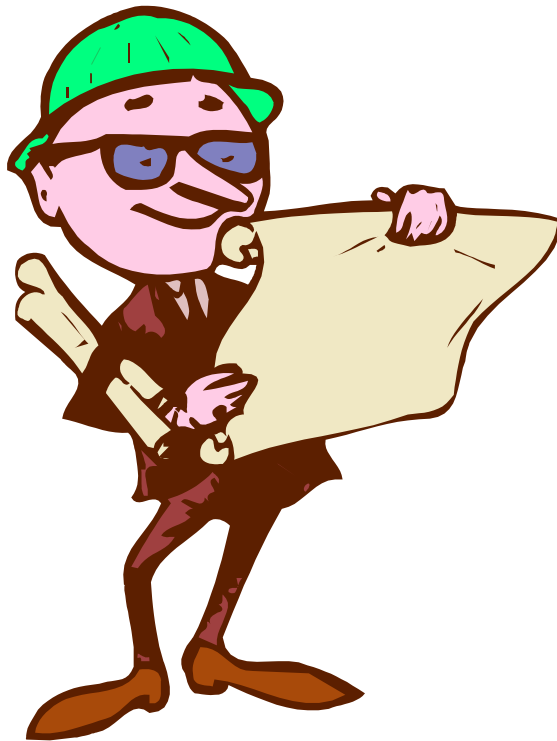
“The engineers are always the weak link in the process. And the contractors will do what they want to do anyway. This is all very troublesome.”

Engineer's Perspective

“If the equipment is available, we can readily meet any code requirements. But, who came up with this stuff anyway? I don't think they knew what they're doing...these crazy code administrators. Can you tell me a technical approach to avoid complying with the code?”



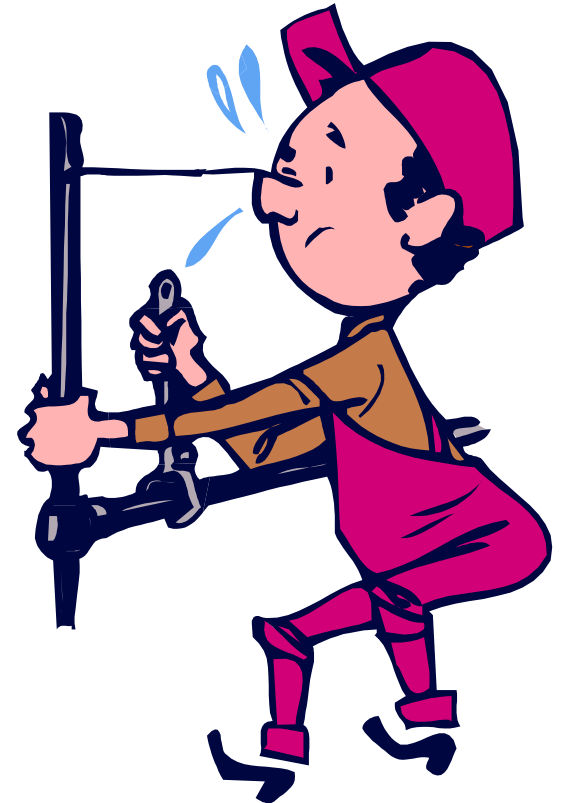
Engineer's Perspective



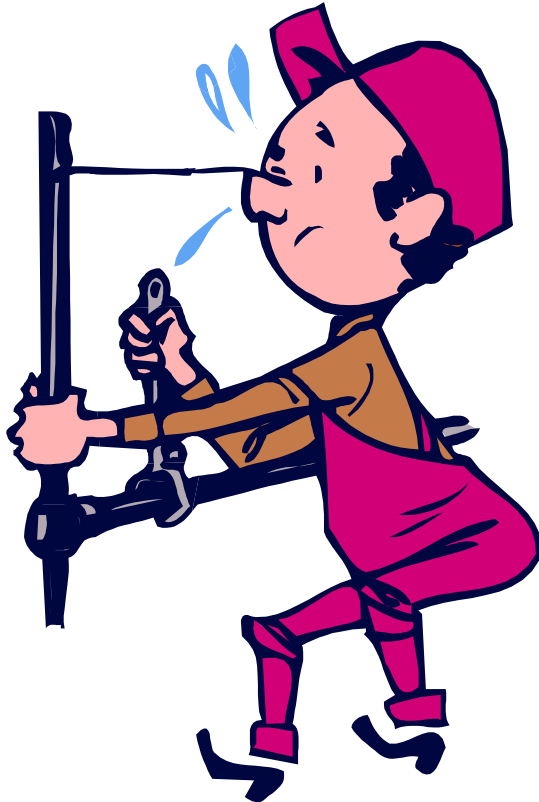
“The architects are the real problem here, you know. We are expected to comply with these codes and they don’t even leave any physical space to fit in all the required systems.”

Contractor's Perspective

“Nobody ever asks us. The architects and engineers spec the systems and we’re expected to make it all work in the field. Who gets the call at 3 AM when a system fails? Not the architect or engineer; it’s us.”



Contractor's Perspective



“Who’s going to make sure that our competition complies with this new code? We will do what we have to do to stay competitive.”

Other Perspectives...

- *“We have to worry about occupant safety and structural integrity; things that are a lot more important than saving a few dollars on the energy bill.”*

Architect

- *“We don’t have to comply with our buildings, they are Tilt-Wall and are designed in Illinois.”*

Architect

- *“This is going to be just like the last energy code; nobody will enforce it, so we’ll all ignore it.”*

Engineer

Other Perspectives...

- *“The word on the street already is that there will be no enforcement. We now know that we can choose on a project-by-project basis whether it is worthwhile to comply with the code. In general, we just ignore it.”*

HVAC Contractor

- *“Our clients keep asking us what they need to comply with the code. Hell; we don’t know.”*

***Lighting Mfg.
Representative***

Energy Code Technical Assistance Circuit Rider

Compliance & Enforcement Issues

- Most session attendees were very interested in what the consequences were if they did not comply with the new energy code.
- Many questions addressed the mechanisms for enforcement and liability if a designer or contractor is identified with the design or construction of non-compliant buildings.
- Session attendees regularly asked who is responsible for making sure that a new design or building is code-compliant.
- Many session attendees had considerable difficulty understanding the basic steps required for approval and acceptance.

Energy Code Technical Assistance Circuit Rider

Building Envelope Requirements

➤ Insulation

- Interpreting Tables and Requirements

➤ Relationship/Confusion Between Air and Vapor Barriers

- Permeability Data
- Air Barrier Materials and Location

➤ Thermal Bridging

- Continuity of Insulation
- Relationship to Condensation & IAQ

➤ LEED Certification



Energy Code Technical Assistance Circuit Rider

HVAC Requirements

➤ Heating and Cooling Load Determination

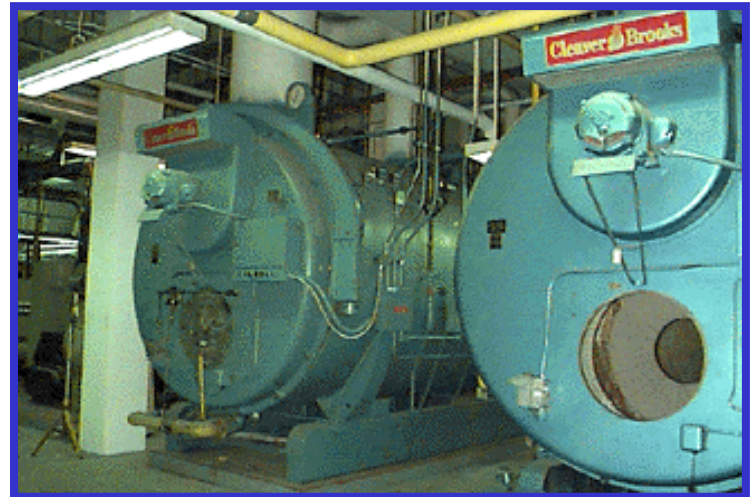
- Safety Factors
- Documentation
- System & Equipment Sizing
- Equipment Redundancy

➤ HVAC Equipment Performance Tables

- Air vs Water Cooled Equipment
- Variable Frequency Drive Chillers

➤ Thermostat & Humidity Control Requirements vs Control Capability

➤ New Construction Programs



Energy Code Technical Assistance Circuit Rider

Electrical & Lighting Requirements

➤ Lighting Power Densities for Certain Building Types

- Display or Accent Lighting
- General vs Task Lighting

➤ Lighting Controls

- What's Really Required?
- Automatic vs Manual

➤ Transformers

- Availability of Products

➤ Using Modern Technologies to Provide Compliance With High Performance

- New Construction Programs



Massachusetts BBRS Technical Assistance Program Circuit Rider

➤ Large Scale Effort to Provide Expert Consulting for:

- Architects
- Engineers
- Contractors
- Vendors
- Building Owners



➤ Technical Assistance Project Conducted Through 2002

➤ Approximately 100 Consulting Sessions Planned

➤ ERS' Consulting Team Includes Engineers and Architects

➤ Similar Requirements to NEEP's Pilot Efforts

Are High Compliance Rates Difficult to Achieve?

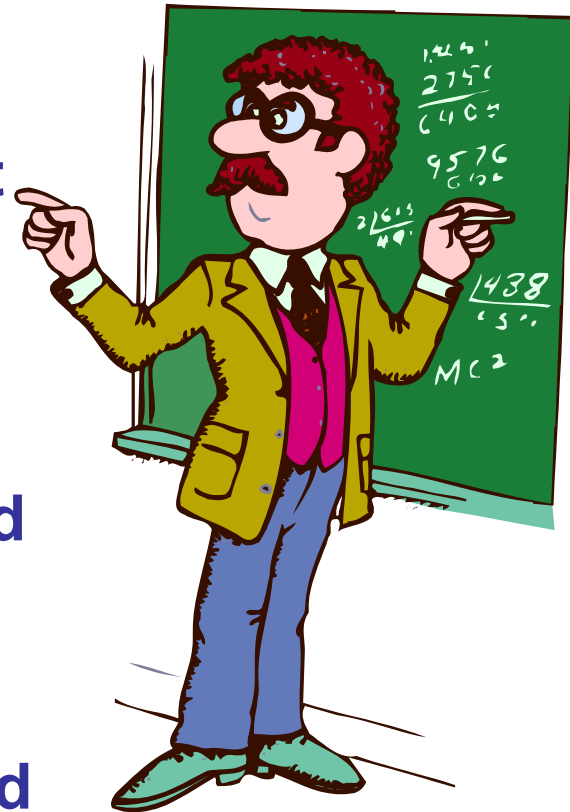
➤ **YES!!!**

- **Lack of Awareness of Codes**
- **Inadequate Education on Technical Approaches**
- **Energy and Resource Efficiency is a Low Priority**
- **Concerns About Competitiveness**
- **Perception - There is No Accountability**

Recommendations

Education

- Energy Efficiency Training for Architects
- Load Estimating/Equipment Sizing Training for HVAC Engineers
- Energy Efficiency/Code Training for Contractors and Vendors
- Energy Efficiency/Code Training for Engineering and Architecture Students



Additional Recommendations

- **Expand Process for Other States**
- **Improve Outreach for Non-Architectural Firms**
- **Produce Simplified List of Code Compliant HVAC Equipment**
- **Produce Additional Narrative Report Samples**
- **Produce Code Compliant Architectural Detail Drawings**
- **Produce Checklists and Guides to Support Code Official Efforts**
- **Integrate Technical Assistance Efforts with Utility Programs**
- **Publish Summary Guides of Available Utility Programs**

Energy Code Circuit Rider Technical Assistance

Conclusion

During numerous technical assistance sessions, firms indicated that as a result of the session they would do better at complying with the new energy code. This applies to design firms who claim they now have an enhanced understanding of the new requirements and to contractors who claim that they previously did not make compliance a priority.

Such changed perspectives are indicators of the general value and success of the technical assistance effort.